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NAVAL AIR SYSTEMS COMMAND
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IN REPLY REFER TO

NAVAIRINST 13034.2

AIR-4.0P
15 Aug 00

NAVAIR INSTRUCTION 13034.2

From: Commander, Naval Air Systems Command

Subj: FLIGHT CLEARANCES FOR UNMANNED AVIATION SYSTEMS

Ref: (a) NAVAIRINST 13034.1A
(b) OPNAVINST 3710.7R

Encl: (1) Unmanned Aviation Systems Flight Clearance Process

1. Purpose. To establish policy, responsibilities and procedures for the airworthiness process within the Naval Aviation Systems TEAM (TEAM) for granting flight clearances for unmanned aviation systems including both their airborne and surface based components. The airworthiness process enhances safety of unmanned aviation systems, which include aerial targets, decoys, and Unmanned Aerial Vehicles (UAVs).

2. Scope. This instruction applies to the Naval Air Systems Command (NAVAIR), the Program Executive Officer (PEO) for Air Anti-Submarine Warfare, Assault and Special Mission Programs (PEO(A)); the PEO for Tactical Aircraft Programs (PEO(T)); and the PEO for Strike Weapons and Unmanned Aviation (PEO(W)). It also applies to fleet units that own, operate, or manage U.S. Navy (USN) or U.S. Marine Corps (USMC) unmanned aviation systems.

3. Background. Reference (a) governs manned aircraft airworthiness approval. The approval is granted for manned aircraft in the form of a flight clearance document. This instruction provides parallel policy for unmanned aviation system flight clearances. However, due to the nature and mission of some unmanned aviation systems, this unmanned instruction recognizes that some UAVs are designed to be "expendable" or are to conduct missions with a "minimum life expectancy" of the air vehicle. An additional course of action, not found in the manned flight clearance process, involves issuance, under certain limited conditions, of a flight clearance that states a "probability of loss" when operating the unmanned system within the requested flight envelope. In this regard, the flight clearance provides an airworthiness assessment within the scope and limits of the design and intended mission of the UAV that allows the Program Manager (PM) to properly manage the risk associated with testing unproven unmanned system concepts and prototypes.

4. Policy

a. Reference (b) establishes Commander, Naval Air Systems Command (COMNAVAIRSYSCOM) as the cognizant technical authority for aircraft owned and/or operated by the USN. As such, COMNAVAIRSYSCOM has cognizance over all

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aircraft/equipment limitations and technical data in Naval Air Training Operating Procedures Standardization (NATOPS) publications, and is responsible for ensuring the airworthiness of all naval aircraft configurations. The COMNAVAIRSYSCOM requires flight clearances to operate unmanned aviation systems and has designated the Airworthiness Office (AIR-4.0P) as the focal point for the issuance of flight clearances for all new Navy aircraft and aviation systems (manned and unmanned) or prior to operation of existing naval aircraft/systems outside of operating limits and/or configurations established as standard by published operational manuals. As such, AIR-4.0P is the single Point of Contact (POC) for the issuance of flight clearances and interim changes to NATOPS and Tactical Manual (TACMANs) for all naval aviation systems for COMNAVAIRSYSCOM within the limits and constraints of reference (b).

b. The appropriate TEAM competencies shall participate in the unmanned aviation system acquisition process as early as possible and continue throughout the program. Competencies shall provide consistency in the caliber and capability of all assigned and/or empowered personnel provided to the program team. Similarly, AIR-4.0P will lead a National Airworthiness Team (NAT) that includes a cross competency group of empowered personnel dedicated to the processing, tracking, and issuance of NAVAIR flight clearances. These empowered individuals are referred to as Flight Clearance Releasing Authorities (FCRAs) who are required to execute the policies of this instruction under the guidance and leadership of the Flight Clearance Officer (FCO) and deputy.

c. The FCRAs are empowered, in part or in full, to issue flight clearances. The level of empowerment and authorization to manage the airworthiness process is defined in the individual "Empowerment Letter" signed by the AIR-4.0P FCO/Deputy. The airworthiness process, as described herein, shall be adhered to consistently throughout NAVAIR. AIR-4.0P may empower qualified members from the TEAM to grant flight clearances. This empowerment is at the sole discretion of the AIR-4.0P FCO/Deputy. The level of empowerment will be based upon the experience of the individual and the complexity of the unmanned aviation system requiring flight clearance.

5. Applicability. Systems to which this instruction applies or does not apply and the relationship between this instruction and related processes are delineated herein.

a. The process, procedures, policy and responsibilities promulgated by this instruction apply to:

(1) unmanned aviation systems owned/leased by the Department of the Navy (DoN), USN and USMC; and

(2) unmanned aviation systems being acquired as part of programs managed by the TEAM.

b. This instruction does not apply to:

(1) contractor or other non-Navy owned or leased air vehicles unless:

(a) COMNAVAIRSYSCOM has entered a formal agreement to act as the flight clearance authority for the subject vehicle and/or; and

(b) a contractor or non-Navy owned/leased air vehicle is operated from/near Navy ships or facilities and, at the discretion of the ship/facility, is required to obtain a flight clearance from AIR-4.0P.

(2) systems operating within the boundaries and configurations authorized by NATOPS (or other approved operating manuals) and/or TACMANs;

(3) weapons of destruction (and unarmed test versions);

(4) optionally piloted vehicles (Navy owned or leased) when manned (these aircraft must obtain a flight clearance following reference (a)); and

(5) aircraft operated in compliance with the Academy of Model Aeronautics (AMA) National Model Aircraft Safety Code.

(Note: the flight clearance process is independent from the range/ship clearance process and does not obviate the need for coordination with the facility or ship to conduct operations),

c. This instruction does not alter the processes, procedures, policies and responsibilities of:

(1) Target Change Review Board (TCRB). The TCRB reviews the airworthiness, range safety, and configuration management aspects of proposed changes to the configuration of aerial targets and decoys. When the TCRB chair has been empowered by AIR 4.0P and serves as an FCRA, the TCRB validation and approval for flight-testing can result in a formal flight clearance issued by this FCRA. Any flight clearance issued by the TCRB Chair in the capacity of an FCRA will be done following standard flight clearance releasing policy and will be formally documented and traceable with an AIR-4.0P date/time group.

(2) Manned Aircraft Certification. Whenever an unmanned aviation system is to be launched from a manned aircraft, the manned aircraft flight clearance process applies to the launch aircraft. Additionally, the manned aircraft flight clearance process applies to optionally piloted vehicles, when manned.

(3) Range Clearances. The range clearance process considers specifics of aircraft flight on the range (e.g. geography, population density, co-use with manned aircraft and other systems, etc.). While a flight clearance is one consideration in the range clearance process, the two processes are separate. That is, range clearance does not constitute a flight clearance, and flight clearance does not constitute a range clearance.

6. Responsibilities

a. COMNAVAIRSYSCOM has cognizance over all naval aviation system equipment operating limitations and technical data. This cognizance is delegated to appropriate competency under the purview of the Assistant Commander for Research and Engineering (AIR-4.0).

b. AIR-4.0P has the responsibility to promulgate operating limitations and technical data by issuing a flight clearance whenever a new aviation system is to be flight tested, or when the aviation system configuration or operating envelope is nonstandard. Heading this group is the military FCO and the civilian deputy/chief airworthiness engineer. The FCO/deputy empowers individuals to sign flight clearances at diverse levels of authority according to their experience and abilities and are referred to as FCRA's. These empowered FCRA's exist at various NAVAIR sites as required for convenience and operational efficiency. It is these personnel at various NAVAIR sites that constitute the NAT. AIR-4.0P is the single point of contact for the issuance of flight clearances for all naval unmanned aviation systems. Additionally, AIR-4.0P is responsible for:

(1) establishing standards, certification and selection criteria for FCRA's to assess airworthiness and issue flight clearances;

(2) approving and oversight of the processes used to issue flight clearances;

(3) maintaining the database, files and records of all flight clearances issued for NAVAIR;

(4) providing guidance and support to the aviation system Integrated Product Teams (IPT) in planning and coordinating the development of an information management plan to identify the engineering data required to result in a timely flight clearance issue;

(5) establishing necessary reviewing competencies for individual flight clearances;

(6) acting as engineering lead for planning meeting and co-signing minutes;

(7) ensuring proper engineering has been accomplished and all applicable processes have been followed prior to issuing clearance; and

(8) approving and overseeing a separate handbook that provides specific guidance on the implementation of this instruction, as well as information on the following areas: definitions; empowerment; request procedures; clearance content; and case studies that may be used for reference.

c. The FCRA is a specific individual within the TEAM organization empowered by AIR-4.0P with the responsibility and authority to issue flight clearances. The FCO's signature directly represents the airworthiness competency. The scope of the empowerment shall be commensurate with the individual's level of engineering expertise and demonstrated understanding of the airworthiness process. The empowerment concept will be used to the maximum extent possible. Detailed responsibilities include:

(1) maintaining the database, files and records of all flight clearances issued;

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(3) issuing flight clearances.

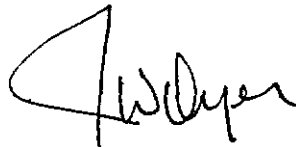
d. The IPT leader has overall responsibility for program funding and coordination of resources required in the execution of the flight clearance process. The IPT leader is responsible for the integration of flight clearance planning milestones into the program development schedule and should work closely with the FCRA to ensure that the flight clearance requested and issued meets program requirements.

e. The cognizant acquisition PM has responsibility for risk management and overall safe execution during the procurement of unmanned aviation systems. The flight clearance process plays an important role by providing technical review of critical parameters.

f. TEAM engineers, in conjunction with the FCRA and IPT leader, are responsible for establishing the data required for issuance of the flight clearance. Subsequently, selected reviewers of this same group will conduct the independent review and assessment of data received.

7. Procedures. Enclosure (1) shows a diagram depicting the generic flight clearance process for unmanned aviation systems

8. Review. AIR-4.0P shall review this instruction annually and coordinate/implement updates and changes as appropriate.



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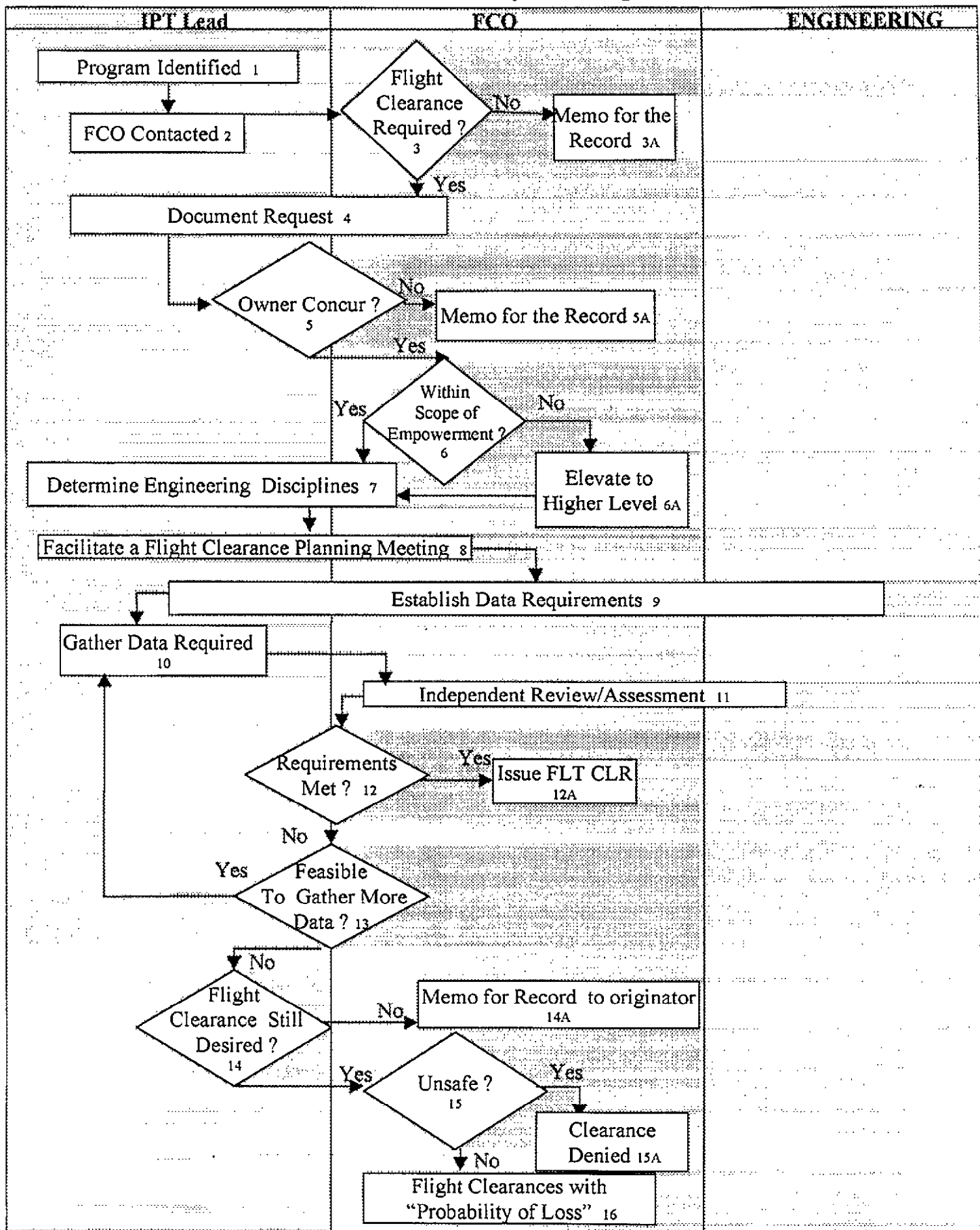
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Unmanned Aviation Systems Flight Clearance Process



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The following narrative explains the Unmanned Aviation Systems Flight Clearance Process illustrated in the flow chart on the preceding page:

1. Program Identified (Block 1). This is the entry point and beginning of the NAVAIR Flight Clearance Process. The IPT or Externally Directed Team (EDT) is established, given a task, and assigned a leader. The leader begins to formulate program plans and schedule to execute the task to staff his team. If there is a requirement to fly a new or never-before-flown unmanned aviation system, or to modify an unmanned aviation system (hardware and/or software) for flight into a non-baseline configured vehicle or change operating limits, change external configuration, payload modification, Ground Control System (GCS) hardware/software modification, or modify an external store; proceed to (Block 2). Program origination may also be identified from outside NAVAIR, typically from fleet assets via naval message. These messages normally go directly to AIR-4.0P.
2. Flight Clearance Officers (FCO) Contacted (Block 2). The IPT/EDT leader provides the FCRA with enough information to determine if a flight clearance is required.
3. Flight Clearance Required? (Block 3). Depending on the source of program identification and the extent of configuration change or envelope expansion, the FCRA may determine at this point that the proposed change does not meet the threshold of a flight clearance. This decision should be made as early as possible to avoid unnecessary expenditure of resources and time, and as a courtesy to the customer so that they may concentrate on other issues associated with the program. If it is determined, based on the information provided, that a clearance is not necessary, then that determination will be forwarded by the FCRA via memorandum of record (hardcopy or electronic mail (E-Mail)) to the customer/IPT lead originally contacting the FCRA (Block 3A).
4. Document Request (Block 4). Once determined that a flight clearance is appropriate (based on the preliminary information at hand and always subject to change), a formal request defining the configuration and desired operating parameters should be submitted. This request should be in the standard seven-part format described in Section IV.D. It can be in the form of a naval message, written letter, or E-Mail, as long as the request is traceable back to the originator. Oral requests (typically via phonecon) will not be acceptable.
5. Owner Concur? (Block 5). The custodian (owner of the vehicle) may request flight clearances. When the request does not come directly from the custodian, the FCRA must ensure that the custodian concurs with the proposed changes. If the owner does not concur, the FCRA will issue a memorandum of record (Block 5A) to the requestor with a copy to the owner. (The ability of non-owners to initiate flight clearance requests differs from the manned process because the custodial responsibilities for targets and UAVs differ from those of manned aircraft.)
6. Within Scope of Empowerment? (Block 6). The flight clearance empowerment for FCRA's designated by AIR-4.0P may be limited to a specific scope. If the FCRA being consulted determines that the clearance sought is beyond his scope, then that FCRA will forward the flight clearance request to the properly empowered individual (Block 6A). The intent will always be to keep the level of FCRA at the lowest level possible, with AIR-4.0P typically becoming involved in

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in complex clearances such as new platform developments, very extensive multi-disciplinary modifications, or as a backup to an FCRA who may not be available.

7. Determine Engineering Disciplines (Block 7). The FCRA determines the competencies (i.e., engineering disciplines) which are required for review of the proposed flight clearance. This determination is based on the information provided in the request, the personal expertise/knowledge of the FCRA, and the needs of the project as articulated by the IPT/EDT leader. The FCRA informs the IPT/EDT leader, in writing, which competencies will need to review the flight clearance. Engineering involvement will typically require a small number of individuals, since most clearances will be minor modifications; these individuals will also normally be members of the IPT/EDT. If the required expertise is not already available within the team, or if the engineer normally reviewing clearance issues for the team was directly involved with data generation/analysis, then the IPT/EDT leadership negotiates with the engineering competencies leadership to obtain the required reviewers.

8. Facilitate a Flight Clearance Planning Meeting (Block 8). IPT/EDT leader schedules and chairs a planning meeting. The required reviewers identified in (Block 7) must attend the planning meeting. FCRA will act as the engineering lead and will be co-signer (along with the IPT/EDT leader) of the planning meeting minutes. The intent of this meeting is to establish the lines of communication and begin the process of developing a complete and detailed understanding of the engineering data required to determine the airworthiness of a system, as well as an understanding of the program schedule. Sometimes it is expected that this will be an iterative process requiring follow-on efforts as program planning matures. The IPT/EDT leader, with support from the FCRA, shall reconvene the conference as appropriate. The IPT/EDT leader and the FCRA shall maintain a record of the plans, schedules, actions and agreements established to support the creation of the Engineering Data Requirements Agreement Plan. The IPT/EDT leader is responsible to report any deviations from the agreed plan to the engineering competency members and the FCRA. Severe program deviations may require a reconvening of the planning conference to renegotiate the Engineering Data Requirements Agreement Plan. A draft clearance may be brought to the planning meeting, or the team may draft it during the meeting, or it may be delegated by the team lead to a team member and drafted at a later time.

9. Establish Data Requirements (Block 9). At the planning meeting the engineering requirements along with schedule for the effort and costs are established. The primary personnel include the appropriate IPT/EDT members and engineers nominated from the competencies identified by the FCRA (Block 7). Contractor personnel shall participate as required. Flight clearance engineering requirements are established using the guidance offered by appropriate unmanned aviation system design criteria and individual competency processes and procedures. Additional descriptive data, analyses, ground tests and flight tests may be identified beyond those cited above depending on the maturity of the technology and the assessed airworthiness. These requirements may be incorporated into a contractual statement of work or an in-house work agreement. The data requirements agreed upon in the planning meeting might be summarized as part of the planning meeting minutes.

10. Gather Data Required (Block 10). This entails the IPT/EDT personnel gathering, analyzing, and evaluating the data (and testing) discussed in the (Block 9) data requirements. The engineers

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identified in Block 7 must provide feedback. Data evaluation or results from some of the testing may generate additional data requirements due to the unknowns that may materialize. This would require a modification to the data requirements. Depending on the complexity of the system, modification, or subject of the flight clearance request, this period may involve substantial interaction within the government and contractor teams. As the analysis is being completed, the draft flight clearance must also be completed for the (Block 11) review.

11. Independent Review/Assessment (Block 11). The independent reviewers will identify engineering issues. When appropriate, they will recommend procedures to mitigate the issues. The reviewers will provide the issues and recommendations to the FCRA who will include them in the draft flight clearance, typically as limitations, special notes, cautions or warnings.

12. Requirements Met? (Block 12). Based upon the recommendations of the reviewing engineers, the FCRA will determine if the technical requirements have been met for issuing the flight clearance. The FCRA will coordinate with the IPT/EDT lead to ensure that the flight clearance to be issued will meet the needs of the program/customer. If the technical requirements have been met, and the IPT/EDT lead is satisfied with the flight clearance that will be issued, the FCRA will issue the flight clearance (Block 12A). If the above conditions are not met, proceed to (Block 13).

13. Feasible To Gather More Data? (Block 13). The team must determine whether it is feasible to pursue the additional data, now seen as necessary, to support the assessment of airworthiness. This is typically seen as a programmatic decision to evaluate potential loss of the vehicle versus the cost of the unprogrammed data collection. If additional engineering requirements are identified and concurrence reached with the IPT/EDT leadership, return to (Block 10) of the process. If the team feels that additional data collection and/or analysis is not feasible, proceed to (Block 14).

14. Flight Clearance Still Desired? (Block 14). The team at this point may elect to discontinue pursuit of the airworthiness evaluation. If not desired at this point, the FCRA will issue a memo to the originator indicating that the clearance will not be further reviewed nor released (Block 14A). If the clearance is still desired, proceed to (Block 15).

15. Unsafe? (Block 15). In those extremely rare cases where danger to personnel or non-program property can not be mitigated and the IPT/EDT lead and FCRA/engineering team cannot come to an agreement, then flight clearance will be denied (Block 15A). That decision will be communicated back to the originator. The options at this point are to reenter the process at the appropriate point, or elevate the issue up the chain of command.

16. Flight Clearances with "Probability of Loss" (Block 16). If analysis indicates that the system is safe with respect to personnel and non-program property but that, based on the available data there are questions regarding the airworthiness of the system, then the clearance will be issued stating such. The decision to fly or not then becomes a programmatic decision. In most cases, this type of clearance will be limited to Research, Development, Test and Evaluation (RDT&E) operations.